

## SEQUENCE LISTING

<110> Toraya, Tetsuo  
 Tobimatsu, Takamasa  
 Yamanishi, Mamoru  
 Mori, Kouichi  
 Kajiura, Hideki  
 Yamada, Seiki  
 Yuzuki, Michio  
 Azuma, Muneaki  
 Hara, Tetsuya  
 Yasuda, Shinzo

<120> Method for Production of 3-hydroxypropionaldehyde

<130> 08917-116US1

<150> PCT/JP2004/014213

<151> 2004-09-29

<150> JP 2003-337663

<151> 2003-09-29

<160> 4

<170> PatentIn version 3.1

<210> 1

<211> 7183

<212> DNA

<213> plasmid pBR322

<400> 1

acgttatcga ctgcacggtg caccaatgct tctggcgctca ggcagccatc ggaagctgtg	60
gtatggctgt gcaggtcgta aatcactgca taattcgtgt cgctcaaggc gcactcccgt	120
tctggataat gttttttgcg ccgacatcat aacggttctg gcaaattatc tgaaatgagc	180
tgttgacaat taatcatcgg ctcgatataat gtgtggaatt gtgagcggat aacaatttca	240
cacaggaaac agtacatatg agatcgaaaa gatttgaagc actggcgaaa cgccctgtga	300
atcaggacgg cttcggttaag gagggtgatc agaagggctt tatcgcgatg gaaagcccga	360
acgacccaaa accgtcgatt aaaatcgtaa acggcgcggt gaccgagctg gacgggaaac	420
cggtaagcga ttttgacctg atcgaccact ttatcgcccc ctacgggtatc aacctgaacc	480
gcgccgaaga agtgatggcg atggattcgg tcaagctggc caacatgctg tgcgatccga	540
acgttaaacy cagcgaaatc gtcccgtga ccaccgcgat gacgccggcg aaaattgtcg	600
aagtggtttc gcatatgaac gtcgtcgaga tgatgatggc gatgcagaaa atgcgcgccc	660
gccgcacccc gtcccagcag gcgcacgtca ccaacgtcaa agataaccg gtacagattg	720

ccgccgacgc	cgccgaaggg	gcatggcgcg	gatttgacga	acaggaaacc	accgttgcg	780
tagcgcgcta	tgcgccgttc	aacgccatcg	cgctgctggt	gggctcgag	gtaggccgtc	840
cgggcggtgct	gacgcagtgc	tcgctggaag	aagccaccga	gctgaagctc	ggcatgctgg	900
gccacacctg	ctacgccgaa	accatctccg	tctacggcac	cgagccggtc	tttaccgacg	960
gcgacgacac	gccgtggtcg	aagggcttcc	tcgcctcgtc	ctacgcctct	cgcgggctga	1020
aaatgcgctt	tacctccggc	tccggctcgg	aagtgcagat	gggctacgcc	gaaggcaa	1080
ccatgcttta	tctggaagcg	cgctgcatct	acatcaccaa	agccgcgggc	gtacagggtc	1140
tgcaaaacgg	ttccgtaagc	tgcatcgggc	tgccgtctgc	ggtgccttcc	ggcattcgcg	1200
cggtgctggc	ggaaaacctg	atctgttcgt	cgctggatct	ggagtgcgcc	tccagcaacg	1260
accagacctt	cacccactcc	gatatgcgtc	gtaccgcgcg	cctgctgatg	cagttcctgc	1320
cgggcaccca	ctttatctcc	tccggttatt	ccgcggtgcc	gaactacgac	aacatgttcg	1380
ccggctccaa	cgaagatgcc	gaagactttg	acgactacaa	cgtcatccag	cgcgacctga	1440
aggtggacgg	cggtttgctg	ccggttcgcg	aagaggacgt	catcgccatc	cgtaacaaag	1500
ccgcccgcgc	gctgcaggcc	gtgtttgccg	gaatggggct	gccgccgatt	accgatgaag	1560
aagttgaagc	cgcgacctac	gcccacgggt	cgaaagatat	gccggagcgc	aacatcgctg	1620
aagacatcaa	gttcgcccag	gaaatcatca	ataaaaaccg	caacgggtctg	gaagtgggtga	1680
aagcgctggc	gcagggcgga	ttcaccgacg	tggcccagga	catgctcaac	atccagaaag	1740
ctaagctgac	cggggactac	ctgcatacct	ccgcgattat	cgtcggcgac	gggcaggtgc	1800
tgtcagccgt	caacgacgtc	aacgactatg	ccggtccggc	aacgggctat	cgctgcagg	1860
gcgaacgctg	ggaagagatt	aaaaacatcc	ctggcgctct	tgatcccaac	gagattgatt	1920
aaggggtgag	aatggaat	taatgaaaaa	ttgctgcgcc	agataattga	agacgtgctc	1980
agcgagatga	agggcagcga	taaaccggtc	tcgtttaatg	cgccggcggc	ctccgcggcg	2040
ccccaggcca	cgccgcccgc	cggcgacggc	ttcctgacgg	aagtgggcga	agcgcgtcag	2100
ggaaccacgc	aggacgaagt	gattatcgcc	gtcggcccgg	ctttcggcct	ggcgagacc	2160
gtcaatatcg	tcggcatccc	gcataagagc	atcttgcgcg	aagtcattgc	cggtattgaa	2220
gaagaaggca	ttaaggcgcg	cgtgattcgc	tgctttaaat	cctccgacgt	ggccttcgtc	2280
gccgttgaag	gtaatcgctc	gagcggctcc	ggcatctcta	tcggcatcca	gtcgaaaggc	2340
accacggtga	tccaccagca	ggggctgccg	ccgctctcta	acctggagct	gttcccgcag	2400

gcgccgctgc	tgacctgga	aacctatcgc	cagatcggca	aaaacgccgc	ccgctatgcg	2460
aaacgcgaat	cgccgcagcc	ggccccgacg	ctgaatgacc	agatggcgcg	gccgaagtac	2520
caggcgaaat	cggccatttt	gcacattaaa	gagaccaagt	acgtggtgac	gggcaaaaac	2580
ccgcaggaac	tgcgcgtggc	gctttgataa	aggataactc	catgaatacc	gacgcaattg	2640
aatcgatgg	acgcgacgta	ttgagccgca	tgaacagcct	gcagggcgag	gcgcctgcgg	2700
cggctccggc	ggctggcggc	gcgtcccgt	gcgccaggg	cagcgactac	ccgctggcga	2760
acaagcacc	ggaatgggtg	aaaaccgcc	ccaataaaac	gctggacgac	tttacgctgg	2820
aaaacgtgct	gagcaataaa	gtcaccgccc	aggatatgcg	tattaccccc	gaaaccctgc	2880
gcttacaggc	ttctattgcc	aaagacgcgg	gccgcgaccg	gctggcgatg	aacttcgagc	2940
gcgccgccga	gctgaccgcg	gtaccggacg	atcgcatctc	tgaaatctac	aacgccctcc	3000
gcccctatcg	ctcgacgaaa	gaggagctgc	tggcgatcgc	cgacgatctc	gaaagccgct	3060
atcaggcgaa	gatttgcgcc	gctttcgttc	gcgaagcggc	cacgctgtac	gtcgagcgta	3120
aaaaactcaa	aggcgacgat	taacttcatt	ccgggcccg	cgacagatcc	ccgggaattc	3180
atcgtgactg	actgacgatc	tgccctcgcg	gtttcggtga	tgacggtgaa	aacctctgac	3240
acatgcagct	cccggagacg	gtcacagctt	gtctgtaagc	ggatgccggg	agcagacaag	3300
cccgtcaggg	cgcgtcagcg	ggtgttggcg	ggtgtcgggg	cgcagccatg	accagtcac	3360
gtagcgatag	cggagtgtat	aattcttgaa	gacgaaaggg	cctcgtgata	cgcctatttt	3420
tataggttaa	tgtcatgata	ataatggttt	cttagacgtc	aggtggcact	tttcggggaa	3480
atgtgcgcgg	aacccttatt	tgtttatttt	tctaaataca	ttcaaataatg	tatccgctca	3540
tgagacaata	accctgataa	atgcttcaat	aatattgaaa	aaggaagagt	atgagtattc	3600
aacatttccg	tgtcgccctt	attccctttt	ttgcggcatt	ttgccttcct	gtttttgctc	3660
accagaaac	gctggtgaaa	gtaaaagatg	ctgaagatca	gttgggtgca	cgagtgggtt	3720
acatcgaact	ggatctcaac	agcggtaaga	tccttgagag	ttttcgcccc	gaagaacgtt	3780
ttccaatgat	gagcactttt	aaagtctctg	tatgtggcgc	ggtattatcc	cgtgttgacg	3840
ccgggcaaga	gcaactcgg	cgccgcatac	actattctca	gaatgacttg	gttgagtact	3900
caccagtcac	agaaaagcat	cttacggatg	gcatgacagt	aagagaatta	tgcagtgctg	3960
ccataaccat	gagtgataac	actgcggcca	acttacttct	gacaacgatc	ggaggaccga	4020
aggagctaac	cgcttttttg	cacaacatgg	gggatcatgt	aactcgcctt	gatcgttggg	4080
aaccggagct	gaatgaagcc	ataccaaacg	acgagcgtga	caccacgatg	cctgcagcaa	4140

tggaacaac	gttgcgcaaa	ctattaactg	gcgaactact	tactctagct	tcccggcaac	4200
aattaataga	ctggatggag	gcggataaag	ttgcaggacc	acttctgcgc	tcggcccttc	4260
cggtggctg	gtttattgct	gataaatctg	gagccggtga	gcgtgggtct	cgcggtatca	4320
ttgcagcact	ggggccagat	ggtaagccct	cccgtatcgt	agttatctac	acgacgggga	4380
gtcaggcaac	tatggatgaa	cgaaatagac	agatcgctga	gatagggtgcc	tactgatta	4440
agcattggta	actgtcagac	caagtttact	catatatact	ttagattgat	ttaaaacttc	4500
atttttaatt	taaaaggatc	taggtgaaga	tcctttttga	taatctcatg	acaaaaatcc	4560
cttaacgtga	gttttcgttc	cactgagcgt	cagaccccg	agaaaagatc	aaaggatctt	4620
cttgagatcc	tttttttctg	cgcgtaatct	gctgcttgca	aacaaaaaaa	ccaccgctac	4680
cagcgggtgt	ttgtttgccg	gatcaagagc	taccaactct	tttccgaag	gtaactggct	4740
tcagcagagc	gcagatacca	aatactgtcc	ttctagtgtg	gccgtagtta	ggccaccact	4800
tcaagaactc	tgtagcaccg	cctacatacc	tcgctctgct	aatcctgtta	ccagtggctg	4860
ctgccagtgg	cgataagtcg	tgtcttaccg	ggttggactc	aagacgatag	ttaccggata	4920
aggcgcagcg	gtcgggctga	acgggggggt	cgtgcacaca	gccagcttg	gagcgaacga	4980
cctacaccga	actgagatac	ctacagcgtg	agctatgaga	aagcgccacg	cttcccgaag	5040
ggagaaaggc	ggacaggtat	ccggtaagcg	gcagggtcgg	aacaggagag	cgcacgaggg	5100
agcttccagg	gggaaacgcc	tggtatcttt	atagtctgtg	cggttttcgc	cacctctgac	5160
ttgagcgtcg	atttttgtga	tgctcgtcag	gggggaggag	cctatggaaa	aacgccagca	5220
acgcggcctt	tttacggttc	ctggcctttt	gctggccttt	tgctcacatg	ttctttcctg	5280
cgttatcccc	tgattctgtg	gataaccgta	ttaccgcctt	tgagtgagct	gataccgctc	5340
gccgcagccg	aacgaccgag	cgcagcgagt	cagtgagcga	ggaagcggaa	gagcgctga	5400
tgcggtat	tctccttacg	catctgtgcg	gtatttcaca	ccgcataaat	tccgacacca	5460
tcgaatggtg	caaaaccttt	cgcggtatgg	catgatagcg	cccgaagag	agtcaattca	5520
gggtggtgaa	tgtgaaacca	gtaacgttat	acgatgtcgc	agagtatgcc	ggtgtctctt	5580
atcagaccgt	ttcccgctg	gtgaaccagg	ccagccacgt	ttctgcgaaa	acgcgggaaa	5640
aagtggaagc	ggcgatggcg	gagctgaatt	acattcccaa	ccgcgtggca	caacaactgg	5700
cgggcaaaca	gtcgttgctg	attggcgttg	ccacctccag	tctggccctg	cacgcgccgt	5760
cgcaaattgt	cgcggcgatt	aaatctcgcg	ccgatcaact	gggtgccagc	gtggtggtgt	5820

cgatggtaga acgaagcggc gtcgaagcct gtaaagcggc ggtgcacaat cttctcgcgc 5880  
 aacgcgtcag tgggctgata attaaactatc cgctggatga ccaggatgcc attgctgtgg 5940  
 aagctgcctg cactaatgtt ccggcggttat ttcttgatgt ctctgaccag acacccatca 6000  
 acagtattat tttctcccat gaagacggta cgcgactggg cgtggagcat ctggtcgcat 6060  
 tgggtcacca gcaaatacgcg ctgttagcgg gccattaag ttctgtctcg gcgcgtctgc 6120  
 gtctggctgg ctggcataaa tatctcactc gcaatcaaata tcagccgata gcggaacggg 6180  
 aaggcgactg gagtgccatg tccggttttc aacaaaccat gcaaatacgtg aatgagggca 6240  
 tcgttcccat tgcgatgctg gttgccaacg atcagatggc gctgggcgca atgcgcgcca 6300  
 ttaccgagtc cgggctgcgc gttggtgcgg atatctcggg agtgggatac gacgataccg 6360  
 aagacagctc atgttatatc ccgccgttaa ccaccatcaa acaggatttt cgctgctgg 6420  
 ggcaaaccag cgtggaccgc ttgctgcaac tctctcaggg ccaggcgggtg aagggaatc 6480  
 agctgttgcc cgtctcactg gtgaaaagaa aaaccaccct ggcgcccaat acgcaaaccg 6540  
 cctctccccg cgcgttggcc gattcattaa tgcagctggc acgacagggt tcccgactgg 6600  
 aaagcgggca gtgagcgcaa cgcaattaat gtgagttagc tactcatta ggcaccccag 6660  
 gctttacact ttatgcttcc ggctcgatatg ttgtgtggaa ttgtgagcgg ataacaattt 6720  
 cacacaggaa acagctatga ccatgattac ggattcactg gccgtcgttt tacaacgtcg 6780  
 tgactgggaa aaccctggcg ttacccaact taatcgctt gcagcacatc cccctttcgc 6840  
 cagctggcgt aatagcgaag aggcccgcac cgatcgccct tcccaacagt tgcgcagcct 6900  
 gaatggcgaa tggcgctttg cctgggtttcc ggcaccagaa gcggtgccgg aaagctggct 6960  
 ggagtgcgat cttcctgagg ccgatactgt cgtcgtcccc tcaaactggc agatgcacgg 7020  
 ttacgatgcg cccatctaca ccaacgtaac ctatccatt acggtcaatc cgccgtttgt 7080  
 tcccacggag aatccgacgg gttgttactc gctcacattt aatgttgatg aaagctggct 7140  
 acaggaaggc cagacgcgaa ttatTTTTga tggcggttga att 7183

<210> 2  
 <211> 6607  
 <212> DNA  
 <213> plasmid p15A

<400> 2  
 gaattaattc tggcgaatcc tctgaccagc cagaaaacga cttttctgtg gtgaaaccgg 60  
 atgctgcaat tcagagcgcc agcaagtggg ggacagcaga agacctgacc gccgcagagt 120

ggatgtttga catggtgaag actatcgac catcagccag aaaaccgaat tttgctgggt	180
gggctaacga tatccgcctg atgcgtgaac gtgacggacg taaccaccgc gacatgtgtg	240
tgctgttccg ctgggcatgc caggacaact tctgggtccg taacgtgctg agcccgcca	300
agcttactcc ccatccccct gttgacaatt aatcatcggc tcgtataatg tgtggaattg	360
tgagcggata acaatttcac acaggaaaca ggatcctagg aggtttaaac atatgcgata	420
tatagctggc attgatatcg gcaactcatc gacggaagtc gccctggcga ccctggatga	480
ggctggcgcg ctgacgatca cccacagcgc gctggcgga accaccgga tcaaaggcac	540
gttgcgtaac gtgttcggga ttcaggaggc gctcgccctc gtcgccagag gcgccgggat	600
cgccgtcagc gatatttcgc tcatccgcac caacgaagcg acgccggtga ttggcgatgt	660
ggcgatggaa accattaccg aaaccatcat caccgaatcg accatgatcg gccataaccc	720
gaaaacgccc ggcgggcgcg ggcttggcac aggcatacc attacgccgc aggagctgct	780
aaccgcgccg gcggacgcgc cctatacctt ggtgggtgctc tcggcgttcg attttgccga	840
tatcgccagc gtgattaacg cttccctgcg cgccgggtat cagattaccg gcgtcatttt	900
acagcgcgac gatggcgtgc tggtcagcaa ccggctggaa aaaccgctgc cgatcgttga	960
cgaagtgtg tacatcgacc gcattccgct ggggatgtg gcggcgattg aggtcgccgt	1020
tccggggaag gtcatcgaaa ccctctctaa cccttacggc atcgccaccg tctttaacct	1080
cagccccgag gagacgaaga acatcgctcc gatggcccgg gcgctgattg gcaaccgttc	1140
cgccgtgggt gtcaaaacgc catccggcga cgtcaaagcg cgcgcgatac ccgccggtaa	1200
tcttgagctg ctggcccagg gccgtagcgt gcgctgggat gtggccgccg gcgccgaagc	1260
catcatgaaa gcggtcgacg gctgcggcag gctcgataac gtcaccggcg aatccggcac	1320
caatatcggc ggcattgctg aacacgtgcg ccagaccatg gccgagctga ccaacaagcc	1380
gagcagcgaa atattttattc aggacctgct ggccgttgat acctcggtac cggtagcgt	1440
taccggcggc ctggccgggg agttctcgct ggagcaggcc gtgggcatcg cctcgatggt	1500
gaaatcggat cgcctgcaga tggcaatgat cggccgcgaa atcgagcaga agctcaatat	1560
cgacgtgcag atcggcgggc cagaggccga agccgccatc ctggggggcg tgaccacgcc	1620
gggcaccacc cgaccgctgg cgatcctcga cctcggcgcg ggctccaccg atgcctccat	1680
catcaacccc aaaggcgaca tcatcgccac ccattctgcc ggcgaggcg acatggtgac	1740
gatgattatt gcccgcgagc tggggctgga agaccgctat ctggcggaag agatcaagaa	1800
gtacccgctg gctaagggtg aaagcctgtt ccatttacgc cacgaggacg gcagcgtgca	1860

gttctttctcc acgccgctgc cgcccgcgct gttcgcccgc gtctgcgtgg tgaaagcgga	1920
cgaactgggtg ccgctgcccc gcgatttagc gctggaaaaa gtgcgcgcca ttcgccgcag	1980
cgccaaagag cgggtctttg tcaccaacgc cctgcgcgcg ctgcgtcagg tcagccccac	2040
cggcaacatt cgcgatattc cgttcgtggg gctggtcggc ggttcgtcgc tggatttcga	2100
agtccccgag ctggtcaccg atgcgctggc gcactaccgc ctggttgccg gacggggaaa	2160
tattcgcggc agcgagggcc cccgaaacgc ggtggccacc ggctgattc tctcctggca	2220
taaggagttt gcgcatgaac ggtaatcaca gcgccccggc catcgcgatc gccgtcatcg	2280
acggctgcga cggcctgtgg cgcgaaagtgc tgctgggtat cgaagaggaa ggtatccctt	2340
tccggctcca gcatcacccg gccggagagg tcgtggacag cgcctggcag gcggcgcgca	2400
gctcgccgct gctggtgggc atcgccctgc accgccatat gctggtcgtg cactacaaga	2460
atttaccgc atcggcgccg ctttttacgc tgatgcatca tcaggacagt caggcccatc	2520
gcaacaccgg taataacgcg gcacggctgg tcaaggggat ccctttccg gatctgaata	2580
gcgaagcaac aggagaacag caggatgaat aagatctcgg gtagcccgcc taatgagcgg	2640
gctttttttt atgagaatta caacttatat cgtatggggc tgacttcagg tgctacattt	2700
gaagagataa attgcaactga aatctagaaa tattttatct gattaataag atgatcttct	2760
tgagatcggt ttggtctgcg cgtaatctct tgctctgaaa acgaaaaaac cgccttgacg	2820
ggcggttttt cgaaggttct ctgagctacc aactctttga accgaggtaa ctggcttgga	2880
ggagcgcagt caccaaaact tgtcctttca gtttagcctt aaccggcgca tgacttcaag	2940
actaactcct ctaaataaat taccagtggc tgctgccagt ggtgcttttg catgtctttc	3000
cgggttgac tcaagacgat agttaccgga taaggcgag cggtcggact gaacgggggg	3060
ttcgtgcata cagtccagct tggagcgaac tgcctaccg gaactgagt tcaggcgtgg	3120
aatgagacaa acgcggccat aacagcgga tgacaccggt aaaccgaaag gcaggaacag	3180
gagagcgac gagggagccg ccagggggaa acgcctggta tctttatagt cctgtcgggt	3240
ttcgccacca ctgatttgag cgtcagattt cgtgatgctt gtcagggggg cggagcctat	3300
ggaaaaacgg ctttgccgcg gccctctcac ttccctgtta agtatcttcc tggcatcttc	3360
caggaaatct ccgccccgtt cgtaagccat ttccgctcgc cgcagtcgaa cgaccgagcg	3420
tagcgagtca gtgagcgagg aagcggaata taccctgtat cacatattct gctgacgcac	3480
cgggtgcagcc ttttttctcc tgccacatga agcacttcac tgacaccctc atcagtgcca	3540

acatagtaag ccagtataca ctccgctagc gctgatgtcc ggcggtgctt ttgccgttac	3600
gcaccacccc gtcagtagct gaacaggagg gacagctgat agaaacagaa gccactggag	3660
cacctcaaaa acaccatcat aactaaatc agtaagttgg cagcatcacc cgacgcactt	3720
tgcgccgaat aaataacctgt gacggaagat cacttcgcag aataaataaa tcctggtgtc	3780
cctggtgata ccgggaagcc ctgggccaac ttttggcgaa aatgagacgt tgatcggcac	3840
gtaagagggtt ccaactttca ccataatgaa ataagatcac taccgggctt attttttgag	3900
ttatcgagat tttcaggagc taaggaagct aaaatggaga aaaaaatcac tggatatacc	3960
accgttgata tatcccaatg gcatcgtaaa gaacattttg aggcattttca gtcagttgct	4020
caatgtacct ataaccagac cgttcagctg gatattacgg cttttttaa gaccgtaaag	4080
aaaaataagc acaagtttta tccggccttt attcacattc ttgcccgcct gatgaatgct	4140
catccggaat ttcgtatggc aatgaaagac ggtgagctgg tgatatggga tagtgttcac	4200
ccttgttaca ccgttttcca tgagcaaact gaaacgtttt catcgctctg gagtgaatac	4260
cacgacgatt tccggcagtt tctacacata tattcgcaag atgtggcgtg ttacggtgaa	4320
aacctggcct atttcctaa agggtttatt gagaatatgt ttttcgtctc agccaatccc	4380
tgggtgagtt tcaccagttt tgattttaaac gtggccaata tggacaactt cttcgcccc	4440
gttttcacca tgggcaaata ttatacgcaa ggcgacaagg tgctgatgcc gctggcgatt	4500
caggttcac atgccgtctg tgatggcttc catgtcggca gaatgcttaa tgaattacaa	4560
cagtactgcg atgagtgga gggcgggcg taattttttt aaggcagtta ttggtgcct	4620
taaacgcctg gtgctacgcc tgaataagt ataataagcg gatgaatggc agaaattcga	4680
aagcaaattc gaccggctg tcggttcagg gcagggctgt taaatagccg cttatgtcta	4740
ttgctggttt accggtttat tgactaccgg aagcagtgtg accgtgtgct tctcaaagtc	4800
ctgaggccag tttgctcagg ctctccccgt ggaggaata attgacgata tgatcattta	4860
ttctgcctcc caaagcaatt ccgacacat cgaatggtgc aaaacctttc gcggtatggc	4920
atgatagcgc ccggaagaga gtcaattcag ggtggtgaat gtgaaaccag taacgttata	4980
cgatgtcgca gagtatgcc gtgtctctta tcagaccgtt tcccgcgtgg tgaaccaggc	5040
cagccacgtt tctgcgaaaa cgcgggaaaa agtggaagcg gcgatggcgg agctgaatta	5100
cattcccaac cgctggcac aacaactggc gggcaaacag tcgttgctga ttggcggtgc	5160
cacctccagt ctggccctgc acgcgccgtc gcaaattgtc gcggcgatta aatctcgcgc	5220
cgatcaactg ggtgccagcg tgggtggtgc gatggtagaa cgaagcggcg tcgaagcctg	5280



```

taaagcggcg gtgcacaatc ttctcgcgca acgcgtcagt gggctgatca ttaactatcc 5340
gctggatgac caggatgccca ttgctgtgga agctgcctgc actaatgttc cggcgttatt 5400
tcttgatgtc tctgaccaga caccatcaa cagtattatt ttctcccatg aagacggtac 5460
gcgactgggc gtggagcatc tggtcgcatt gggtcaccag caaatcgcgc tgtagcggg 5520
ccattaagt tctgtctcgg cgcgtctgcg tctggctggc tggcataaat atctcactcg 5580
caatcaaatt cagccgatag cggaacggga aggcgactgg agtgccatgt ccggttttca 5640
acaaaccatg caaatgctga atgagggcat cgttcccatc gcgatgctgg ttgccaacga 5700
tcagatggcg ctgggcgcaa tgcgcgccat taccgagtcc gggctgcgcg ttggtgcgga 5760
tatctcggtg gtgggatacg acgataccga agacagctca tggtatatcc cgccgttaac 5820
caccatcaaa caggattttc gcctgctggg gcaaaccagc gtggaccgct tgctgcaact 5880
ctctcagggc caggcggtga agggcaatca gctgttgccc gtctcactgg tgaaaagaaa 5940
aaccaccctg gcgccaata cgcaaaccgc ctctccccgc gcgttggccg attcattaat 6000
gcagctggca cgacaggttt cccgactgga aagcgggcag tgagcgcaac gcaattaatg 6060
tgagttagct cactcattag gcaccccagg ctttacactt tatgcttccg gctcgtatgt 6120
tgtgtggaat tgtgagcgga taacaatttc acacaggaaa cagctatgac catgattacg 6180
gattcactgg ccgtcgtttt acaacgtcgt gactgggaaa accctggcgt taccgaactt 6240
aatcgccttg cagcacatcc ccctttcgcc agctggcgta atagcgaaga ggcccgacc 6300
gatcgccctt cccaacagtt gcgcagcctg aatggcgaat ggcgctttgc ctggtttccg 6360
gcaccagaag cggtgccgga aagctggctg gagtgcgatc ttctgaggc cgatactgtc 6420
gtcgtccctt caaactggca gatgcacggt tacgatgcgc ccatctacac caacgtaacc 6480
tatcccatta cggccaatcc gccgtttgtt cccacggaga atccgacggg ttgttactcg 6540
ctcacattta atgttgatga aagctggcta caggaaggcc agacgcgaat tatttttgat 6600
ggcgttg 6607

```

```

<210> 3
<211> 7023
<212> DNA
<213> plasmid pBR322

```

```

<400> 3
acgttatcga ctgcacggtg caccaatgct tctggcgtca ggcagccatc ggaagctgtg 60
gtatggctgt gcaggtcgta aatcactgca taattcgtgt cgctcaaggc gcactcccgt 120

```

tctggataat gttttttgcg ccgacatcat aacggttctg gcaaattatc tgaaatgagc	180
tgttgacaat taatcatcgg ctcgataat gtgtggaatt gtgagcggat aacaatttca	240
cacaggaaac agtacatatg aaaagatcaa aacgatttgc agtactggcc cagcgccccg	300
tcaatcagga cgggctgatt ggcgagtggc ctgaagaggg gctgatcgcc atggacagcc	360
cctttgacct ggtctcttca gtaaaagtgg acaacgggtc gatcgtcgaa ctggacggca	420
aacgccggga ccagtttgac atgatcgacc gatttatcgc cgattacgcg atcaacgttg	480
agcgcacaga gcaggcaatg cgcctggagg cgggtggaat agcccgtatg ctggtggata	540
ttcacgtcag cggggaggag atcattgcc aactaccgc catcacgcc gccaaagcgg	600
tcgaggtgat ggcgcagatg aacgtggtgg agatgatgat ggcgctgcag aagatgcgtg	660
cccgcgggac cccctccaac cagtgccacg tcaccaatct caaagataat ccggtgcaga	720
ttgccgctga cgccgccgag gccgggatcc ggggcttctc agaacaggag accacggctg	780
gtatcgcgcg ctacgcgccg tttaacgccc tggcgctgtt ggtcggttcg cagtgcggcc	840
gccccggcgt gttgacgcag tgctcggtag aagaggccac cgagctggag ctgggcatgc	900
gtggcttaac cagctacgcc gagacggtgt cgggtctacg caccgaagcg gtatttaccg	960
acggcgatga tacgccgtgg tcaaaggcgt tcctcgctc gccctacgcc tcccgcgggt	1020
tgaaaatgcg ctacacctcc ggcaccggat ccgaagcgct gatgggctat tcggagagca	1080
agtcgatgct ctacctcgaa tcgcgctgca tcttcattac taaaggcgcc ggggttcagg	1140
gactgcaaaa cggcgcggtg agctgtatcg gcatgaccgg cgctgtgccg tcgggcattc	1200
gggcgggtgct ggcggaaaac ctgatcgctt ctatgctcga cctcgaagtg gcgtccgcca	1260
acgaccagac tttctccac tcggatatc gccgcaccgc gcgcaccctg atgcagatgc	1320
tgccgggcac cgactttatt ttctccggct acagcgcggt gccgaactac gacaacatgt	1380
tcgccggctc gaacttcgat gcggaagatt ttgatgatta caacatcctg cagcgtgacc	1440
tgatggttga cggcggcctg cgtccggtga ccgaggcgga aaccattgcc attcgccaga	1500
aagcggcgcg ggcgatccag gcggttttcc gcgagctggg gctgccgcca atcgccgacg	1560
aggaggtgga ggccgccacc tacgcgcacg gcagcaacga gatgccgccg cgtaacgtgg	1620
tgagagatct gagtgcggtg gaagagatga tgaagcgcaa catcaccggc ctcgatattg	1680
tcggcgcgct gagccgcagc ggctttgagg atatcgccag caatattctc aatatgctgc	1740
gccagcgggt caccggcgat tacctgcaga cctcggccat tctcgatcgg cagttcgagg	1800

tggtgagtgc ggtcaacgac atcaatgact atcagggggc gggcaccggc tatcgcatct	1860
ctgccgaacg ctgggcgag atcaaaaata ttccgggcgt gggtcagccc gacaccattg	1920
aataaggcgg tattcctgtg caacagacaa cccaaattca gccctctttt accctgaaaa	1980
cccgcgaggg cggggtagct tctgccgatg aacgcgccga tgaagtgggtg atcggcgctcg	2040
gccctgcctt cgataaacac cagcatcaca ctctgatcga tatgccccat ggcgcgatcc	2100
tcaaagagct gattgccggg gtggaagaag aggggcttca cgcccgggtg gtgcgcattc	2160
tgcgcacgtc cgacgtctcc tttatggcct gggatgcggc caacctgagc ggctcgggga	2220
tcggcatcgg tatccagtcg aaggggacca cggatcatcca tcagcgcgat ctgctgccgc	2280
tcagcaacct ggagctgttc tcccaggcgc cgctgctgac gctggagacc taccggcaga	2340
ttggcaaaaa cgctgcgcgc tatgcgcgca aagagtcacc ttcgccgggtg ccggtggtga	2400
acgatcagat ggtgcggccg aaatttatgg ccaaagccgc gctatttcat atcaaagaga	2460
ccaaacatgt ggtgcaggac gccgagcccg tcacctgca catcgactta gtaaggaggt	2520
gaccatgagc gagaaaacca tgcgcgtgca ggattatccg ttagccacc gctgcccgga	2580
gcatatcctg acgcctaccg gcaaaccatt gaccgatatt accctcgaga aggtgctctc	2640
tggcgagggtg ggcccgcagg atgtgcggat ctcccgccag acccttgagt accaggcgca	2700
gattgccgag cagatgcagc gccatgcggt ggcgcgcaat ttccgccgcg cggcgagct	2760
tatcgccatt cctgacgagc gcattctggc tatctataac gcgctgcgc cgttccgctc	2820
ctcgcaggcg gagctgctgg cgatcgccga cgagctggag cacacctggc atgcgacagt	2880
gaatgccgcc tttgtccggg agtcggcgga agtgtatcag cagcggcata agctgcgtaa	2940
aggaagctaa gcggagggtca gcatgccgtt aatagccggg attgataatt ccgggcccgt	3000
cgacagatcc ccgggaattc atcgtgactg actgacgatc tgccctcgcg gtttcgggtga	3060
tgacggtgaa aacctctgac acatgcagct cccggagacg gtcacagctt gtctgtaagc	3120
ggatgccggg agcagacaag cccgtcaggg cgcgtcagcg ggtgttggcg ggtgtcgggg	3180
cgcagccatg acccagtcac gtagcgatag cggagtgtat aattcttgaa gacgaaaggg	3240
cctcgtgata cgcctatttt tatagggttaa tgtcatgata ataatggttt cttagacgtc	3300
aggtggcact tttcggggaa atgtgcgcgg aaccctatt tgtttatttt tctaaataca	3360
ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat aatattgaaa	3420
aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt ttgcggcatt	3480
ttgccttctt gtttttgctc acccagaaac gctgggtgaaa gtaaaagatg ctgaagatca	3540

gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga tccttgagag	3600
ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc tatgtggcgc	3660
ggtattatcc cgtgttgacg ccgggcaaga gcaactcggg cgccgcatac actattctca	3720
gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg gcatgacagt	3780
aagagaatta tgcagtgtcg ccataacat gagtgataac actgcgcca acttacttct	3840
gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg gggatcatgt	3900
aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaagc acgagcgtga	3960
caccacgatg cctgcagcaa tggcaacaac gttgcgcaa ctattaactg gcgaactact	4020
tactctagct tcccggcaac aattaataga ctggatggag gcggataaag ttgcaggacc	4080
acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg gagccggtga	4140
gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct cccgtatcgt	4200
agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac agatcgctga	4260
gataggtgcc tcactgatta agcattggta actgtcagac caagtttact catatatact	4320
ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga tcctttttga	4380
taatctcatg accaaaatcc cttaacgtga gttttcgctt cactgagcgt cagaccccg	4440
agaaaagatc aaaggatctt cttgagatcc tttttttctg cgcgtaatct gctgcttgca	4500
aacaaaaaaa ccaccgctac cagcgggtgg ttggttgccg gatcaagagc taccaactct	4560
ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgtcc ttctagtgt	4620
gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc tcgctctgct	4680
aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg ggttggactc	4740
aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggt cgtgcacaca	4800
gccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg agctatgaga	4860
aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg gcagggtcgg	4920
aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggatatctt atagtcctgt	4980
cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag gggggcggag	5040
cctatggaaa aacgccagca acgcggcctt ttacggctt ctggcctttt gctggccttt	5100
tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta ttaccgcctt	5160
tgagtgaagt gataccgctc gccgcagccg aacgaccgag cgcagcgagt cagtgaagca	5220

ggaagcgga	gagcgctga	tgcggtat	tctccttacg	catctgtgcg	gtatttcaca	5280
ccgcataaat	tccgacacca	tcgaatggtg	caaaaccttt	cgcggtatgg	catgatagcg	5340
cccggaagag	agtcaattca	gggtggtgaa	tgtgaaacca	gtaacgttat	acgatgtcgc	5400
agagtatgcc	ggtgtctctt	atcagaccgt	ttcccgcgtg	gtgaaccagg	ccagccacgt	5460
ttctgcgaaa	acgcgggaaa	aagtggaagc	ggcgatggcg	gagctgaatt	acattcccaa	5520
ccgcgtggca	caacaactgg	cgggcaaaca	gtcgttgctg	attggcgttg	ccacctccag	5580
tctggccctg	cacgcgccgt	cgcaaattgt	cgcggcgatt	aaatctcgcg	ccgatcaact	5640
gggtgcccagc	gtggtggtgt	cgatggtaga	acgaagcggc	gtcgaagcct	gtaaagcggc	5700
ggtgcacaat	cttctcgcgc	aacgcgtcag	tgggctgata	attaactatc	cgctggatga	5760
ccaggatgcc	attgctgtgg	aagctgcctg	cactaatgtt	ccggcgttat	ttcttgatgt	5820
ctctgaccag	acacccatca	acagtattat	tttctcccat	gaagacggta	cgcgactggg	5880
cgtggagcat	ctggtcgcac	tgggtcacca	gcaaactcgc	ctgttagcgg	gcccattaag	5940
ttctgtctcg	gcgcgtctgc	gtctggctgg	ctggcataaa	tatctcactc	gcaatcaa	6000
tcagccgata	gcggaacggg	aaggcgactg	gagtgccatg	tccggttttc	aacaaaccat	6060
gcaaatactg	aatgagggca	tcgttcccac	tgcgatgctg	gttgccaacg	atcagatggc	6120
gctgggcgca	atgcgcgcca	ttaccgagtc	cgggctgcgc	gttggtgcgg	atatctcgg	6180
agtgggatac	gacgataccg	aagacagctc	atgttatatc	ccgccgttaa	ccaccatcaa	6240
acaggat	cgctgctgg	ggcaaaccag	cgtggaccgc	ttgctgcaac	tctctcagg	6300
ccaggcggtg	aagggcaatc	agctgttgcc	cgtctcactg	gtgaaaagaa	aaaccaccct	6360
ggcgcccaat	acgcaaaccg	cctctccccg	cgcgttggcc	gattcattaa	tgcagctggc	6420
acgacaggtt	tcccgactgg	aaagcgggca	gtgagcgcaa	cgcaattaat	gtgagttagc	6480
tcactcatta	ggcaccacag	gctttacact	ttatgcttcc	ggctcgtatg	ttgtgtggaa	6540
ttgtgagcgg	ataacaattt	cacacaggaa	acagctatga	ccatgattac	ggattcactg	6600
gccgtcgttt	tacaacgtcg	tgactgggaa	aaccctggcg	ttaccaact	taatcgcctt	6660
gcagcacatc	cccccttcgc	cagctggcgt	aatagcgaag	aggcccgcac	cgatcgccct	6720
tccaacag	tgcgcagcct	gaatggcgaa	tggcgctttg	cctgggttcc	ggcaccagaa	6780
gcggtgccgg	aaagctggct	ggagtgcgat	cttcctgagg	ccgatactgt	cgtcgtcccc	6840
tcaaactggc	agatgcacgg	ttacgatgcg	cccatctaca	ccaacgtaac	ctatccatt	6900
acggtcaatc	cgccgtttgt	tcccacggag	aatccgacgg	gttgttactc	gctcacattt	6960

aatgttgatg aaagctggct acaggaaggc cagacgcgaa ttatTTTTga tggcgTtggg 7020  
att 7023

<210> 4  
<211> 6608  
<212> DNA  
<213> plasmid p15A

<400> 4  
gaattaattc tggcgaatcc tctgaccagc cagaaaacga cctttctgtg gtgaaaccgg 60  
atgctgcaat tcagagcgcc agcaagtggg ggacagcaga agacctgacc gccgcagagt 120  
ggatgtttga catggtgaag actatcgac catcagccag aaaaccgaat ttgctgggt 180  
gggctaacga tatccgcctg atgctgtaac gtgacggacg taaccaccgc gacatgtgtg 240  
tgctgttccg ctgggcatgc caggacaact tctgggtccg taacgtgctg agcccgcca 300  
agcttactcc ccatccccct gttgacaatt aatcatcggc tcgtataatg tgtggaattg 360  
tgagcggata acaatttcac acaggaaaca ggatcctagg aggtttaaac atatgtcgct 420  
ttcaccgcca ggcgtacgcc tgttttacga tccgcgcggg caccatgccg gcgccatcaa 480  
tgagctgtgc tgggggctgg aggagcaggg ggtcccctgc cagaccataa cctatgacgg 540  
aggcgggtgac gccgctgcgc tgggcgccct ggcggccaga agctcgcccc tgcgggtggg 600  
tatcgggctc agcgcgtccg gcgagatagc cctcactcat gccagctgc cggcggacgc 660  
gccgctggct accggacacg tcaccgatag cgacgatcaa ctgcgtacgc tcggcgccaa 720  
cgccgggcag ctggttaaag tcctgccgtt aagtgcgaga aactgaagat cctaggaggt 780  
ttaaacatat gccgttaata gccgggattg atatcgcaa cgccaccacc gaggtggcgc 840  
tggcgtccga ctaccgcag gcgagggcgt ttgttgccag cgggatcgtc gcgacgacgg 900  
gcatgaaagg gacgcgggac aatatcgccg ggaccctcgc cgcgctggag caggccctgg 960  
cgaaaacacc gtggtcgatg agcgatgtct ctcgcatcta tcttaacgaa gccgcgccgg 1020  
tgattggcga tgtggcgatg gagaccatca ccgagaccat tatcacgaa tcgaccatga 1080  
tcggtcataa cccgcagacg ccgggcgggg tgggcgttgg cgtggggacg actatcgccc 1140  
tcgggcggct ggcgacgctg ccggcggcgc agtatgccga ggggtggatc gtactgattg 1200  
acgacgccgt cgatttcctt gacgccgtgt ggtggctcaa tgaggcgtc gaccggggga 1260  
tcaacgtggt ggcggcgatc ctcaaaaagg acgacggcgt gctggtgaac aaccgcctgc 1320  
gtaaaacctt gccggtggtg gatgaagtga cgctgctgga gcaggtcccc gagggggtaa 1380

tggcggcggt ggaagtggcc gcgccgggcc aggtggtgcg gatcctgtcg aatccctacg	1440
ggatcgccac cttcttcggg ctaagcccgg aagagacca ggccatcgtc cccatcgccc	1500
gcgccctgat tggcaaccgt tccgcggtgg tgctcaagac cccgcagggg gatgtgcagt	1560
cgcggtgat cccggcgggc aacctctaca ttagcggcga aaagcgccgc ggagaggccg	1620
atgtcgccga gggcgcgga gccatcatgc aggcgatgag cgcctgcgct ccggtacgcg	1680
acatccgcg cgaaccgggc acccacgccg gcggcatgct tgagcgggtg cgcaaggtaa	1740
tggcgctccct gaccggccat gagatgagcg cgatatacat ccaggatctg ctggcggtgg	1800
atacgtttat tccgcgcaag gtgcagggcg ggatggccgg cgagtgcgcc atggagaatg	1860
ccgtcgggat ggcggcgatg gtgaaagcg atcgtctgca aatgcagggt atcgcccgcg	1920
aactgagcgc ccgactgcag accgaggtgg tgggtggcg cgtaggagcc aacatggcca	1980
tcgccggggc gttaaccact cccggctgtg cggcgccgct ggcgatcctc gacctcggcg	2040
ccggctcgac ggatgcggcg atcgtcaacg cggaggggca gataacggcg gtccatctcg	2100
ccggggcggg gaatatggtc agcctgttga ttaaaaccga gctgggcctc gaggatcttt	2160
cgctggcgga agcgataaaa aaataccgc tggccaaagt ggaaagcctg ttcagtattc	2220
gtcacgagaa tggcgcggtg gagttctttc ggaagccct cagcccggcg gtgttcgcca	2280
aagtgggtgta catcaaggag ggcgaactgg tgccgatcga taacgccagc ccgctggaaa	2340
aaattcgtct cgtgcgccg caggcgaaag agaaagtgtt tgtcaccaac tgctgcgcg	2400
cgctgcgcca ggtctcacc gccggttcca ttcgcgatat cgcctttgtg gtgctggtgg	2460
gcggctcatc gctggacttt gagatccgc agcttatcac ggaagccttg tcgcactatg	2520
gcgtggctgc cgggcagggc aatattcggg gaacagaagg gccgcgcaat gcggtcgcca	2580
ccgggctgct actggccgg caggcgaatt aaagatctcg gtagccgc ctaatgagcg	2640
ggcttttttt tatgagaatt acaacttata tcgtatgggg ctgacttcag gtgctacatt	2700
tgaagagata aattgcactg aaatctagaa atattttatc tgattaataa gatgatcttc	2760
ttgagatcgt tttggtctgc gcgtaatctc ttgctctgaa aacgaaaaa ccgccttgca	2820
gggcggtttt tcgaagggtc tctgagctac caactctttg aaccgaggt actggcttgg	2880
aggagcgag tcacaaaaac ttgtcctttc agtttagcct taaccggcg atgacttcaa	2940
gactaactcc tctaaatcaa ttaccagtgg ctgctgccag tggtgctttt gcatgtcttt	3000
ccgggttgga ctcaagacga tagttaccg ataaggcgca gcggtcggac tgaacggggg	3060

gttcgtgcat	acagtccagc	ttggagcgaa	ctgcctaccc	ggaactgagt	gtcaggcgtg	3120
gaatgagaca	aacgcggcca	taacagcgga	atgacaccgg	taaaccgaaa	ggcaggaaca	3180
ggagagcgca	cgagggagcc	gccaggggga	aacgcctggt	atctttatag	tcctgtcggg	3240
tttcgccacc	actgatttga	gcgtcagatt	tcgtgatgct	tgtcaggggg	gctgagccta	3300
tggaaaaacg	gctttgccgc	ggccctctca	cttccttgtt	aagtatcttc	ctggcatctt	3360
ccaggaaaac	tccgccccgt	tcgtaagcca	tttcgctcgc	ccgcagtcga	acgaccgagc	3420
gtagcgagtc	agtgagcgag	gaagcggaat	atatcctgta	tcacatattc	tgctgacgca	3480
ccggtgcagc	cttttttctc	ctgccacatg	aagcacttca	ctgacaccct	catcagtgcc	3540
aacatagtaa	gccagtatac	actccgctag	cgctgatgtc	cggcggtgct	tttgccgtta	3600
cgcaccaccc	cgtcagtagc	tgaacaggag	ggacagctga	tagaaacaga	agccactgga	3660
gcacctcaaa	aacaccatca	tacactaaat	cagtaagttg	gcagcatcac	ccgacgcact	3720
ttgcgccgaa	taaataacctg	tgacggaaga	tcacttcgca	gaataaataa	atcctggtgt	3780
ccctgttgat	accggaagc	cctgggcca	cttttggcga	aatgagacg	ttgatcggca	3840
cgtaagaggt	tccaactttc	accataatga	aataagatca	ctaccgggcg	tattttttga	3900
gttatcgaga	ttttcaggag	ctaaggaagc	taaaatggag	aaaaaatca	ctggatatac	3960
caccgttgat	atatcccaat	ggcatcgtaa	agaacatttt	gaggcatttc	agtcagttgc	4020
tcaatgtacc	tataaccaga	ccgttcagct	ggatattacg	gcctttttta	agaccgtaaa	4080
gaaaaataag	cacaagtttt	atccggcctt	tattcacatt	cttgcccgcg	tgatgaatgc	4140
tcatccggaa	tttcgtatgg	caatgaaaga	cggtgagctg	gtgatatggg	atagtgttca	4200
cccttgttac	accgttttcc	atgagcaaac	tgaaacgttt	tcatcgctct	ggagtgaata	4260
ccacgacgat	ttccggcagt	ttctacacat	atattcgcaa	gatgtggcgt	gttacgggtga	4320
aaacctggcc	tatttcctta	aagggtttat	tgagaatatg	tttttcgtct	cagccaatcc	4380
ctgggtgagt	ttcaccagtt	ttgattttaa	cgtggccaat	atggacaact	tcttcgcccc	4440
cgttttcacc	atgggcaaat	attatacgca	aggcgacaag	gtgctgatgc	cgctggcgat	4500
tcagggttcat	catgccgtct	gtgatggctt	ccatgtcggc	agaatgctta	atgaattaca	4560
acagtactgc	gatgagtggc	agggcggggc	gtaatttttt	taaggcagtt	attggtgccc	4620
ttaaacgcct	ggtgctacgc	ctgaataagt	gataataagc	ggatgaatgg	cagaaattcg	4680
aaagcaaatt	cgacccggtc	gtcggttcag	ggcagggctg	ttaaatagcc	gcttatgtct	4740
attgctgggt	taccggttta	ttgactaccg	gaagcagtgt	gaccgtgtgc	ttctcaaatg	4800



cctgaggcca gtttgcctcag gctctccccg tggaggtaat aattgacgat atgatcattt	4860
attctgcctc ccaaagcaat tccgacacca tcgaatggtg caaaaccttt cgcggtatgg	4920
catgatagcg cccggaagag agtcaattca ggggtggtgaa tgtgaaacca gtaacgttat	4980
acgatgtcgc agagtatgcc ggtgtctctt atcagaccgt ttcccgcgtg gtgaaccagg	5040
ccagccacgt ttctgcgaaa acgcgggaaa aagtggaagc ggcgatggcg gagctgaatt	5100
acattcccaa ccgcgtggca caacaactgg cgggcaaaca gtcgttgctg attggcgctg	5160
ccacctccag tctggccctg cgcgcgccgt cgcaaattgt cgcggcgatt aaatctcgcg	5220
ccgatcaact ggggtgccagc gtgggtggtg cgatggtaga acgaagcggc gtcgaagcct	5280
gtaaagcggc ggtgcacaat cttctcgcgc aacgcgtcag tgggctgac attaactatc	5340
cgctggatga ccaggatgcc attgctgtgg aagctgcctg cactaatgtt ccggcgttat	5400
ttcttgatgt ctctgaccag acacccatca acagtattat tttctcccat gaagacggta	5460
cgcgactggg cgtggagcat ctggtcgcat tgggtcacca gcaaactcgc ctgttagcgg	5520
gccattaag ttctgtctcg gcgcgtctgc gtctggctgg ctggcataaa tatctcactc	5580
gcaatcaaat tcagccgata gcggaacggg aaggcgactg gagtgccatg tccggttttc	5640
aacaaaccat gcaaagtctg aatgagggca tcgttccac tgcgatgctg gttgccaacg	5700
atcagatggc gctgggcgca atgcgcgcca ttaccgagtc cgggctgcgc gttggtgcgg	5760
atatctcggg agtgggatac gacgataccg aagacagctc atgttatatc ccgccgttaa	5820
ccaccatcaa acaggatttt cgctgtctgg ggcaaaccag cgtggaccgc ttgctgcaac	5880
tctctcaggg ccaggcggtg aagggaatc agctgttgcc cgtctcactg gtgaaaagaa	5940
aaaccacctt ggcgcccaat acgcaaaccg cctctccccg cgcgttgcc gattcattaa	6000
tgcagctggc acgacaggtt tcccgaactg aaagcgggca gtgagcgaac cgcaattaat	6060
gtgagttagc tactcatta ggcacccag gctttacact ttatgcttcc ggctcgtatg	6120
ttgtgtggaa ttgtgagcgg ataacaattt cacacaggaa acagctatga ccatgattac	6180
ggattcactg gccgtcgttt tacaacgtcg tgactgggaa aacctggcg ttaccact	6240
taatcgcctt gcagcacatc cccctttcgc cagctggcgt aatagcgaag aggccgcac	6300
cgatcgcctt tcccaacagt tgcgcagcct gaatggcgaa tggcgctttg cctggtttcc	6360
ggcaccagaa gcggtgccgg aaagctggct ggagtgcgat cttcctgagg ccgatactgt	6420
cgtcgtcccc tcaaactggc agatgcacgg ttacgatgcg cccatctaca ccaacgtaac	6480

ctatcccatt acggtcaatc cgccgtttgt tcccacggag aatccgacgg gttggttactc	6540
gctcacattt aatgttgatg aaagctggct acaggaaggc cagacgcgaa ttatTTTTga	6600
tggcgttg	6608